

| Iron | Carbon Shafts | | | Steel Shafts A | | | Steel Shafts B | | |
|------|---------------|-------|----------------|----------------|-------|----------------|----------------|-------|----------------|
| | Length | Mass | Center of mass | Length | Mass | Center of mass | Length | Mass | Center of mass |
| | (mm) | (g) | (%) | (mm) | (g) | (%) | (mm) | (g) | (%) |
| #2 | 975 | 122.3 | 53.2 | 975 | 124.3 | 50.3 | 975 | 125.2 | 51.4 |
| #3 | 965 | 121.6 | 53.0 | 965 | 123.9 | 50.0 | 965 | 122.8 | 51.0 |
| #4 | 953 | 121.4 | 53.0 | 953 | 123.9 | 50.6 | 953 | 124.4 | 51.3 |
| #5 | 940 | 120.9 | 53.0 | 940 | 123.3 | 50.3 | 940 | 123.7 | 51.0 |
| #6 | 927 | 120.5 | 53.0 | 927 | 122.9 | 50.6 | 927 | 120.2 | 51.2 |
| #7 | 914 | 120.3 | 53.0 | 914 | 123.3 | 50.5 | 914 | 117.3 | 51.0 |
| #8 | 901 | 120.2 | 53.0 | 901 | 123.2 | 50.4 | 901 | 119.0 | 51.1 |
| #9 | 889 | 120.2 | 53.0 | 889 | 122.2 | 50.4 | 889 | 114.8 | 51.1 |
| #10 | 876 | 120.0 | 52.8 | 876 | 120.9 | 50.3 | 876 | 115.7 | 51.6 |

(Note) the center of mass (%) is calculated by dividing the distance from the tip of the shaft to its center of mass by the full length of the shaft.

FIG. 1

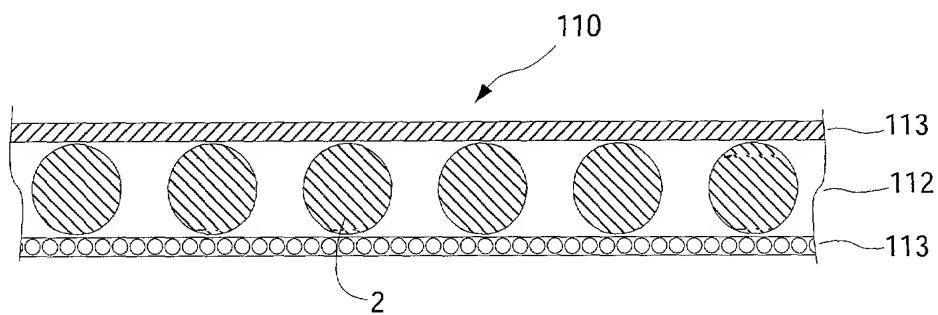


FIG. 2

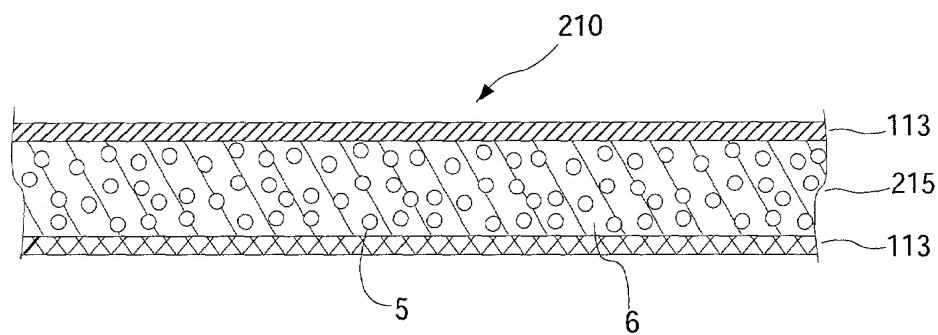


FIG. 3

| Fiber Type | Specific mass (g/cm ³) | Thickness (μm) | Tensile Strength (Mpa) | Elastic Modulus (Gpa) |
|---------------------------------------|---------------------------------------|-------------------|---------------------------|--------------------------|
| Tungsten | 19.3 | 30~100 | 2940 | 412 |
| Molybdenum | 10.2 | 30~100 | 1960 | 333 |
| Piano Wire | 7.8 | 100 | 3038 | 196 |
| Stainless Steel Wire | 7.8 | 100 | 2624 | 176 |
| Amorphous Alloy (Fe-Si-B type) | 7.8 | 70~100 | 3626 | 157 |
| Super-fine metal (Fe-C-Si-Mn type) | 7.8 | 15~100 | 3920~5292 | 196 |

FIG. 4

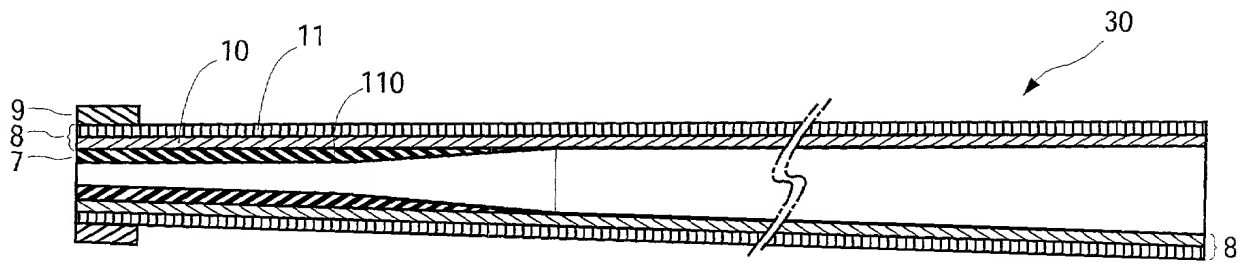


FIG. 5

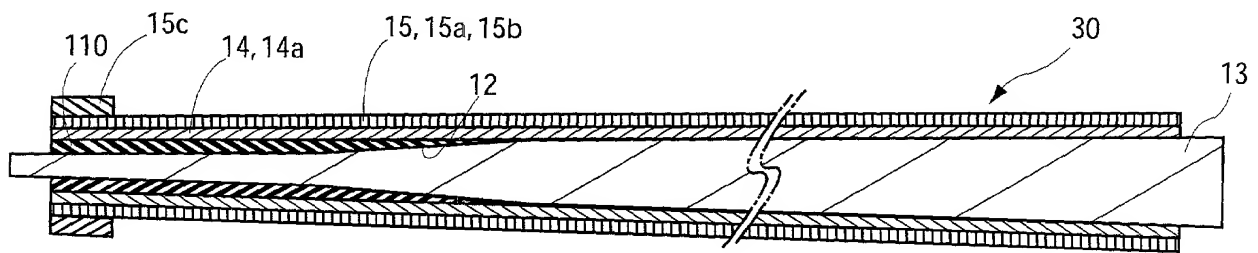


FIG. 6

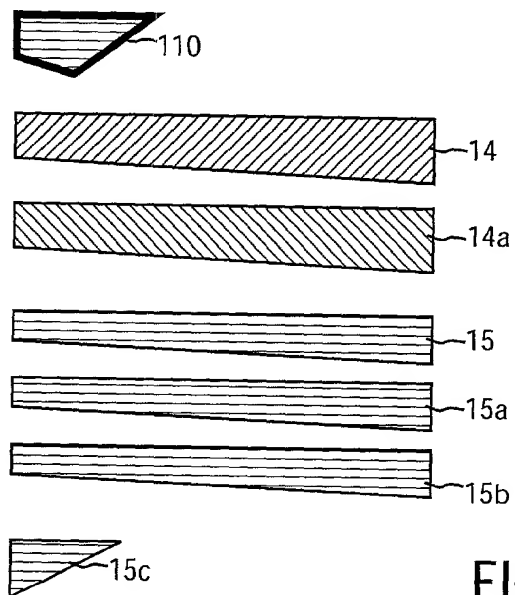


FIG. 7

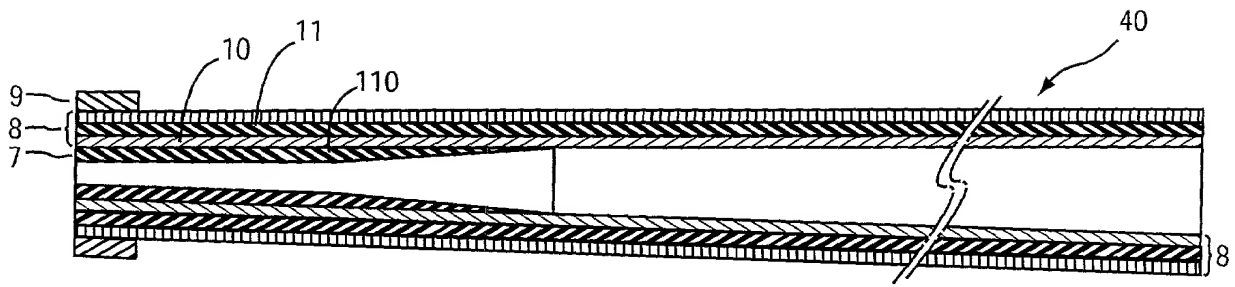


FIG. 8

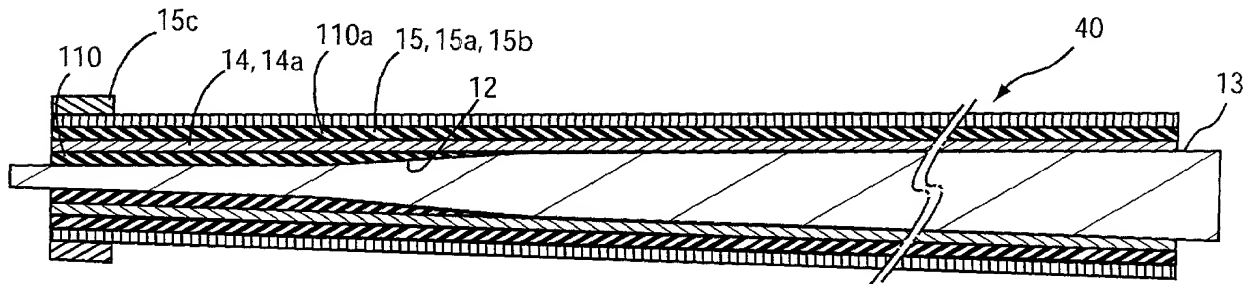


FIG. 9

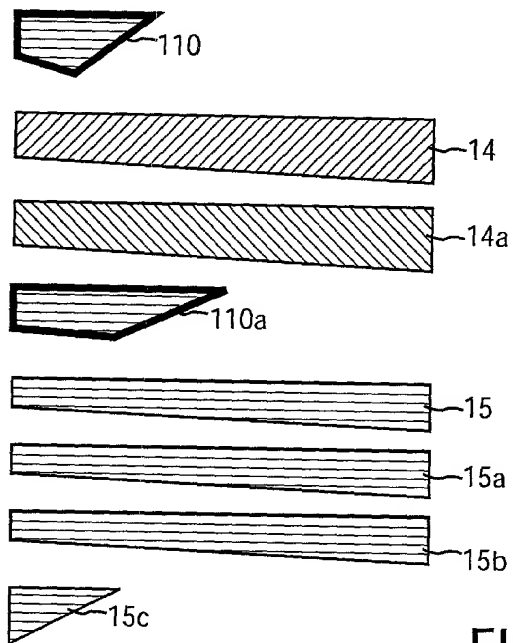


FIG. 10

| | # | Mass (g) | Center of mass | El Value | Outside Diameter (mm) |
|-----------------------|---|-------------|----------------|----------|--------------------------|
| Example | 1 | 120.6 | 49.4 | 3.70 | 11.53 |
| | 2 | 120.7 | 50.1 | 3.73 | 11.50 |
| | 3 | 120.6 | 50.3 | 3.68 | 11.52 |
| | 4 | 105.7 | 50.5 | 3.74 | 11.03 |
| | 5 | 96.1 | 49.3 | 4.12 | 10.99 |
| Comparison Example | 1 | 102.7 | 52.8 | 3.18 | 10.83 |
| | 2 | 11936 | 49.8 | 4.90 | 11.83 |
| | 3 | 123.1 | 44.4 | 4.06 | 12.36 |
| Ref. Example | 1 | 122.6 | 50.3 | 3.74 | 10.04 |
| | 2 | 124.5 | 50.8 | 3.32 | 10.01 |

FIG. 11

| | # | Balance | Toe Down | Distance (yd) | Rt.&Lt. Deviation | Feeling | Overall Evaluation |
|-----------------------|---|---------|-------------|------------------|----------------------|---------|-----------------------|
| Example | 1 | D1 | 1.5 | 178 | 1.2 | 4.5 | 4.5 |
| | 2 | D1 | 1.5 | 180 | 1.4 | 4.2 | 4.0 |
| | 3 | D1 | 1.4 | 176 | 1.8 | 4.3 | 4.0 |
| | 4 | D0 | 1.6 | 1830 | 1.5 | 4.5 | 4.5 |
| | 5 | D0 | 1.7 | 188 | 1.3 | 4.0 | 4.5 |
| Comparison Example | 1 | D0 | 2.5 | 178 | 2.5 | 3.5 | 3.5 |
| | 2 | D0 | 1.5 | 167 | 1.7 | 2.3 | 2.0 |
| | 3 | D4 | 1.4 | 161 | 1.8 | 2.5 | 2.5 |
| Ref. Example | 1 | D1 | 1.5 | 171 | 1.5 | 4.0 | 4.0 |
| | 2 | D0 | 1.5 | 173 | 1.7 | 4.2 | 4.0 |

FIG. 12

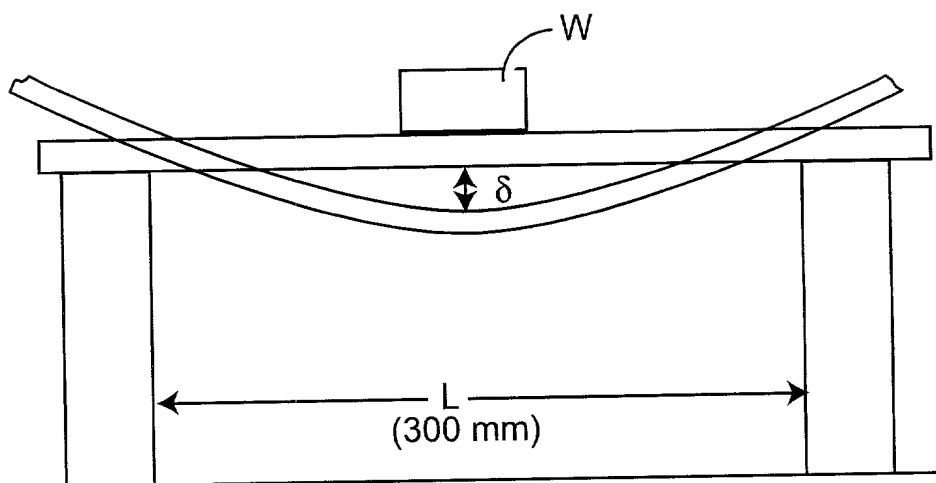


FIG. 13

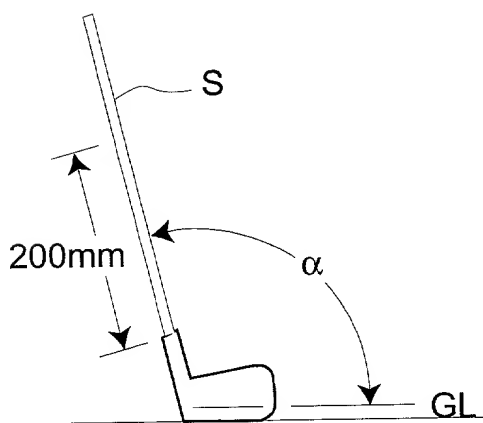


FIG. 14(a)

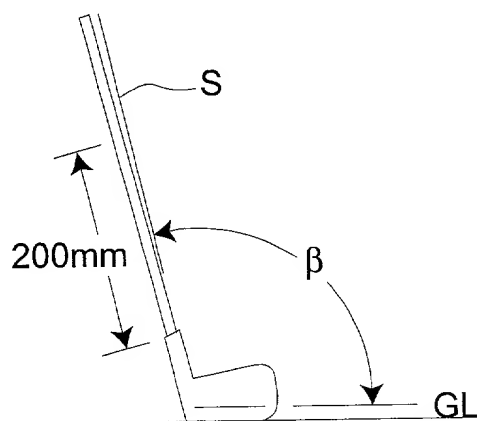


FIG. 14(b)